# Curriculum alignment, articulation and the formative development of the learner

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# Abstract

Articulating and aligning the curriculum is a complex and time-consuming endeavour, requiring the cooperation and collaboration of teachers, educational managers and regulators. Synergies of this sort may however not always be forthcoming or can be problematized by issues of individual autonomy—or its disappearance—and issues of capacity and infrastructure. For example, schools as the micro centres of learning are increasingly outmoded where in a globalized age the school community is heterogeneous and made up of myriad identities and cultural, social and economic backgrounds. Learner toolkits may be massively inconsistent, and no matter how much teachers plan, their capacity to steer or facilitate learning may be hindered by factors external to the learning environment.

For the IB, as an international provider of education, an awareness of the different social, cultural, economic and political contexts is preconditional to the shaping of curriculum, not least in ensuring that what is taught matches the requirements for national requirements and that what is "written" as curriculum is transferable as a "taught" curriculum. It is essential to appreciate that curriculum is never static nor immutable but is a process of constant evolution in response to an ever-changing world. The principal educational offerings of the IB—the Primary Years Programme, the Middle Years Programme, the Diploma Programme and the IB Career-related Certificate (IBCC)—serve to respond to the interconnectedness of a globalized world. The IB stresses an emphasis on the acculturation of the individual as a cohesive whole or as a learning citizen and this comes from a seamless learning trajectory or interweaving of learners within the fabric of the learning experience. Elucidating learners' social, cultural, economic and political relationship to the world comes most effectively where the learning space facilitates smooth learning transitions, where the powers of cognition are reinforced and expanded by being able to look reflectively at the knowledge and skills that have brought him/her thus far. In the IB vision of the holistic learner, the self-recognition of the learner as an active agent within a knowledge continuum is key. The cultivation of a positive learner identity, the building of self-efficacy, legitimacy and mobility comes from the enlargement of *learning capital*. Crucially, learning capital is not the exclusive entitlement of the socio-economically advantageous but is something realistically attainable for those whose experience of education is of learning as focused, meaningful and relevant. Learners ought therefore to be not only inhabitants but authors of the learning experience. They must be cognizant of the roadmap plotting their educational journeys. In so doing, learners may be more suitably equipped to tackle the multiple challenges of the labour market and their role as knowledge workers within a knowledge economy.

To promote better understanding of theoretical and practical aspects of curriculum articulation and alignment, this literature review report, *Curriculum alignment, articulation and the formative development of the learner* by Dr Richard Watermeyer initially examines various definitions of curriculum alignment and articulation; analyzes possible impacts of credentialism, assessment and marketization of education on the development of varied and involved curriculums; explores initiatives and approaches of articulating and aligning in international contexts, at the school level and also beyond the classroom, and identifies issues related to curriculum articulation and alignment such as inequality, misalignment, social diversity, equality and mobility. Consequently, implications for the development of the IB education and programmes are drawn from the review.



# Résumé

## Alignement et articulation du programme d'études et le développement formatif de l'apprenant

L'articulation et l'alignement du programme d'études est une entreprise complexe qui demande beaucoup de temps et qui requiert la coopération et la collaboration des enseignants, des responsables pédagogiques et des autorités de réglementation. De telles synergies ne sont cependant pas toujours faciles à mettre en place ou peuvent être remises en question à cause de problèmes liés à l'autonomie individuelle (ou à sa disparition), à la capacité et à l'infrastructure. Par exemple, la vision des établissements scolaires en tant que micro centres d'apprentissage s'avère de plus en plus dépassée à l'époque de la globalisation, où la communauté scolaire est hétérogène et constituée d'une myriade d'identités et de vécus culturels, sociaux et économiques différents. Les outils à la disposition des apprenants ne sont pas toujours cohérents, et malgré tous les efforts fournis par les enseignants en termes de planification, leur capacité à guider et faciliter l'apprentissage peut être entravée par des facteurs externes à l'environnement d'apprentissage.

L'IB, en qualité de prestataire d'éducation internationale, considère qu'une prise en compte des divers contextes sociaux, culturels, économiques et politiques est une condition *sine qua non* à la conception du programme d'études. Il n'en est pas moins du fait de s'assurer que les enseignements dispensés sont en

accord avec les exigences nationales et que le programme d'études, dans sa forme « rédigée », est transférable en tant que programme « enseigné ». Il est primordial de garder à l'esprit qu'un programme d'études n'est jamais immuable ou figé dans le marbre, mais qu'il s'agit d'un processus en perpétuelle évolution, en réponse à un monde qui ne cesse de changer. Les trois principales offres éducatives de l'IB – le Programme primaire, le Programme de premier cycle secondaire, Programme du diplôme et le certificat à orientation professionnelle de l'IB (COPIB) – ont pour but de s'inscrire dans l'interdépendance d'un monde global. L'IB met l'accent sur l'acculturation de l'individu en tant que partie d'un tout ou en tant que citoyen en phase d'apprentissage. Cela est réalisable grâce à une trajectoire d'apprentissage continue ou l'intégration des apprenants à l'expérience d'apprentissage. La clarification des relations sociales, culturelles, économiques et politiques qu'entretient l'apprenant avec le monde extérieur n'est efficace que lorsque l'espace d'apprentissage assure des transitions d'apprentissage sans heurts, et que les pouvoirs de la cognition sont renforcés et sublimés par la capacité de l'apprenant à réfléchir sur les savoirs et les compétences qui lui ont permis d'arriver à ce stade. Selon la vision qu'a l'IB de l'apprenant global, la reconnaissance personnelle de l'apprenant comme acteur au sein d'un continuum de connaissances est essentielle. La formation d'une identité d'apprenant positive, c'est-à-dire la construction de l'efficacité personnelle, de la légitimité et de la mobilité, provient de l'élargissement du capital d'apprentissage. Plus important encore, le capital d'apprentissage n'est pas l'apanage des classes aisées au niveau socio-économique, mais il est possible de l'atteindre dans une perspective réaliste par ceux dont l'expérience de l'apprentissage repose sur la concentration, la pertinence et le sens. C'est pourquoi les apprenants ne doivent pas être de simples passagers mais les conducteurs de l'expérience d'apprentissage. Ils doivent être conscients de la feuille de route où sont tracés leurs itinéraires pédagogiques. En suivant cette approche, les apprenants seront mieux équipés pour faire face aux nombreux défis du monde du travail et à leur rôle de travailleurs du savoir dans une économie basée sur la connaissance.

Afin de promouvoir une meilleure compréhension des aspects théoriques et pratiques de l'alignement et l'articulation du programme d'études, le rapport sur l'étude documentaire rédigé par Richard Watermeyer et intitulé *Curriculum alignment, articulation and the formative development of the learner* (Alignement et articulation du programme d'études et le développement formatif de l'apprenant), commence par l'examen de plusieurs définitions de l'alignement et l'articulation du programme d'études. Il se penche ensuite sur les répercussions potentielles de la « diplômanie », de l'évaluation et de la « marchéisation » de l'éducation sur le développement de programmes d'études variés et impliquant les élèves. Il aborde des approches et des initiatives d'articulation et d'alignement dans des contextes internationaux, au niveau de l'établissement et au-delà de la salle de classe, et identifie par la suite les problèmes liés à l'articulation et l'alignement du programme d'études tels que l'inégalité, le désalignement, la diversité sociale, l'égalité et la mobilité. Par conséquent, de nombreuses implications pour le développement de l'éducation et des programmes de l'IB sont tirées de ce rapport.

# Resumen

## La articulación y alineación del currículo y el desarrollo formativo del alumno

Articular y alinear el currículo es una tarea larga y complicada que requiere la cooperación y colaboración de docentes, miembros del personal directivo de los colegios y legisladores. Sin embargo, este tipo de sinergias no siempre se dan o pueden ser problemáticas debido a problemas de (falta de) autonomía individual o de capacidad e infraestructura. Por ejemplo, los colegios como microcentros de aprendizaje están cada vez más anticuados en tanto que, en la era de la globalización, la comunidad escolar es heterogénea y está compuesta de una miríada de identidades y de entornos culturales, sociales y económicos. Las herramientas de aprendizaje de los alumnos pueden ser muy dispares e, independientemente de la buena planificación que pueda realizar el profesor, su capacidad para guiar y facilitar el aprendizaje puede verse entorpecida por factores externos al entorno de aprendizaje.

Para el IB, como proveedor internacional de educación, ser consciente de los diversos contextos sociales, culturales, económicos y políticos es condición previa indispensable para dar forma al currículo, no solo para garantizar que lo enseñado cumple con los requisitos nacionales, sino también para asegurarse de que el currículo *escrito* puede convertirse en currículo *enseñado.* Es esencial notar que el currículo no es estático ni inmutable, sino que se trata de un proceso en constante evolución en respuesta a un mundo cambiante. Las titulaciones principales del IB (el Programa de la Escuela Primaria, el Programa de los Años Intermedios, el Programa del Diploma y el Certificado de estudios con orientación profesional [COPIB]) sirven para responder a la interconexión de un mundo globalizado. El IB hace hincapié en la importancia de la aculturación del individuo como un todo cohesivo o como un ciudadano alumno y esto, a su vez, proviene de una trayectoria fluida en la que los alumnos están entretejidos en el seno de la experiencia de aprendizaje. La relación social, cultural, económica y política del alumno con el mundo se puede dilucidar más eficazmente en los casos en que el ambiente de aprendizaje facilita transiciones de

aprendizaje fluidas, en las que las capacidades cognitivas se ven reforzadas y ampliadas por la capacidad del alumno de reflexionar sobre los conocimientos y habilidades que lo han llevado hasta ese punto. Para la visión del IB del alumno holístico, el autorreconocimiento del alumno como agente activo dentro del continuo de conocimiento es un elemento clave. La cultivación de una identidad de alumno positiva, la creación de la autoeficacia, la legitimidad y la movilidad provienen del aumento del capital de aprendizaje. Resulta crucial el hecho de que el capital de aprendizaje no es un derecho exclusivo de quienes proceden de un contexto socioeconómico acomodado, sino que es alcanzable para aquellos cuya experiencia de la educación es la de un aprendizaje centrado, significativo y pertinente. Por lo tanto, los alumnos deben ser autores de la experiencia de aprendizaje y no solo habitantes de esta. Deben ser conscientes de la ruta por la que discurrirá su viaje educativo. De ese modo, los alumnos podrán estar mejor equipados para hacer frente a los múltiples retos del mercado laboral y para desempeñar su papel como trabajadores en una economía basada en la producción de conocimientos.

Para fomentar una mejor comprensión de los aspectos teóricos y prácticos de la articulación y la alineación del currículo, este informe de revisión de la bibliografía, *Curriculum alignment, articulation and the formative development of the learner* (La articulación y alineación del currículo y el desarrollo formativo del alumno) del Dr. Richard Watermeyer, examina inicialmente varias definiciones de alineación y articulación del currículo; analiza los posibles impactos del credencialismo, la evaluación y la comercialización de la educación en el desarrollo de currículos variados y que exigen un compromiso por parte de los alumnos comprometidos; explora iniciativas y enfoques de articulación y alineación en contextos internacionales, en el ámbito del colegio y también más allá del aula, e identifica problemas relacionados con la articulación y la alineación del currículo, tales como la desigualdad, falta de alineación, diversidad social, igualdad y movilidad. Por consiguiente, de esta revisión se deducen las implicaciones para el desarrollo de la educación y los programas del IB.

# Preamble

This report uses a definition of alignment and articulation of curriculum as a reciprocal and co-informing process:

> Alignment is a process of linkage between individuals and events along a learning continuum by which the content of what is learnt and the relationship of the learner to this are articulated.

The word "relationship" is central to discussion, where the alignment and articulation of curriculum are premised on the accumulation of diverse social interactions and their mapping. Any critical observation of the curriculum should be based on an awareness of learning as a socially situated activity or a process of relations among people engaged in activity in, with and emergent from a socially-constructed world (Lave & Wenger 1991). The most effective educational systems are therefore those premised on a relationship of trust, mutual respect and shared vision among all educational stakeholders—schools, teachers, parents, students—and where written and taught iterations of curriculums and the expectations of learners and educators are aligned. Where curriculum design and implementation loses its social inflection and methodological focus and/or where members of the educational community are fractured, disconnected or made disparate, the value and rigour of the learning process dissipates. This is arguably most keenly felt where learners themselves are disenfranchised from the learning process—where curriculum has been inappropriately translated or pitched; where learner/instructor/examiner expectations are unmet or antithetical; or where the threads that constitute a body of knowledge are frayed or disentangled.

Where curriculum is beyond the reach of learners or outsides learners' modes of reference or interaction, it may consequently appear inapproachable, unrelated, inconsequential and lose traction. It is therefore prerequisite that while the curriculum follows a clear rationale linking instructional content with pedagogy and assessment, that the instability and even volatility of the learning process is recognized. This however is habitually forgotten. A supposition that knowledge acquisition and the appropriation/application of expertise occurs in a linear or incremental manner frequently features in the structural arrangements of curriculums and instruction, even though learning pathways are most often haphazard, mazy, contingent and serendipitous. The full articulation of the learner and the learning subject may consequently suffer where the alignment of instructional content, pedagogy and assessment are narrowly conceived, or where learner identities/profiles/capacities are homogenized.

It is in this context that an experiential reinvestment in curriculum is advocated. Where the curriculum is made participatory and driven by an emergent, less prearranged content, it is simultaneously diversified, made relevant on multiple terms and unbuckled from the harness of educational conservatism. As will be discussed, curriculums need alignment beyond the contexts of formal educational settings and in reference to real-world contexts. Situated in the context of local society, the curriculum is made real yet also personal. This of course is a considerable challenge for an educational provider such as the International Baccalaureate (IB) as it works in a global educational marketplace.

The experiential way of learning as advocated by the likes of John Dewey, Ira Shor and through the critical and border pedagogies of Paulo Freire and Henry Giroux identifies the curriculum as most alive and meaningful when experienced through direct participation. Through direct and immersive experience of subject knowledge alternative interpretations of the curriculum and learners' identities in response to these will emerge. The most effective teachers in this context are those who convey the purposefulness of schooling and getting the most out of every available minute of the school-day, while facilitating students' growing capacity to manage their own learning. Where this occurs, the various cues or reminders that guide and scaffold students—the points of articulation—will gradually become less obvious as the school year progresses.

Unfortunately, as Brophy (2000) points out, the educational community of policymakers, textbook publishers and teachers has become unnecessarily focused on content coverage and learning activities at the expense of larger educational ambitions and goals integral to curriculum planning. Students in this context are overwhelmed by a deluge of content—a myriad of subject topics; yet the coverage of each topic is regularly brief, cursory and/or superficial. Subject areas may be treated with inadequate detail, attention or depth and appear incoherent, cluttered and unrelated. Furthermore, knowledge content may be taught in isolation and separately to the development of core skills. A network of learning—skills and content integrated—is in this occurrence bypassed. Sound curriculum planning that aligns instructional content with core skill sets and explicit teacher expectations is therefore critical in (re)connecting students to an affinity with subject knowledge, enabling learning in depth, increasing the opportunity to learn and optimizing learner performance.

Goal-oriented curriculum is one method is circumventing the discontinuities and fracture of school learning that cause learner ennui. Of course these goals require consensus among the educational community. The curriculum is not in itself an end but an enabler and/or "pass-card" preparing students for their roles in adult life. The goal of the curriculum is in catalysing learner outcomes—knowledge, skills, values and dispositions requisite for students' meaningful contribution and successful integration as active citizens.

In the building and cultivation of knowledge and skills, students must be enabled to predict where their learning trajectory is going but equally be able to retrace their learning steps. In other words, learning requires connectivity and ability on the part of the learner in drawing together both knowledge content and skills in a way that is useful and meaningful; certainly where knowledge and skills in isolation are redundant and profligate. Articulating and aligning the curriculum while making explicit the thread and momentum of learning is therefore paramount to the formation of learners' active citizenship in the classroom and beyond.

Of course, curriculum may be enriched by its exterior context as much as that within and across. A horizontal alignment of curriculums may allow subject disciplines to move from seeming fragmented and unrelated to integrated and as a constitutive of a more holistic education. A vertical alignment of the curriculum ensures that learners' experience of knowledge and new skills occurs incrementally and in a way that enhances and literally "builds-upon" preceding learning encounters. The integrated curriculum may not only cross-fertilize and co-inform subject knowledge but provide an educational ballast enabling the learner to make more fluid transitions between subject specialisms (Drake & Crawford Burns 2004). Such linkage may also synchronize the development of core skills and knowledge, indigenous or at least most prevalent in specific subject domains. The interface of subject knowledge may correlate to the production of a more rounded curriculum and with it, more rounded learners. All this will be discussed.

# Review methodology

This review is informed by a comprehensive review of scholarly, "grey" and official literature documenting the conceptual and operational approaches to curriculum articulation and alignment. That is to say, it identifies and critically reflects upon key literature that underpins the history and philosophy of alignment and articulation, new forms of argumentation and analysis and means of evaluation. It will ensure a representative, broad and non-partisan overview of ideas attributed to practitioner, policy and academic groups. The review refers to or incorporates the following.

1. Prominent/celebrated peer-reviewed publications that exist within and constitute the canon of curriculum studies:
    - academic journal articles
    - monographs
    - edited collections or special issues
    - conference proceedings
2. Critical reviews, reports and case studies commissioned by:
    - a range of non-governmental organizations (NGOs)—national/international interest groups, educational charities, learned societies, think tanks
    - national and international governments or government agencies—internal IB reports, strategic plans and other forms of grey literature
3. Formal documentation such as government white papers, policy statements, press releases, briefings
4. Commentary articles in trade papers such as *Times Educational Supplement*
5. Online, open-access articles
6. Professional online forums and blogs

A broad literature search was conducted using the key terms and through a range of key academic or peer-review journals—academic search mechanisms, educational research repositories, and online research catalogues and interfaces such as Google Scholar.

Categorization was scaffolded (including the identification of core themes) by the primary research questions using a grounded theory approach with some degree of flexibility (for a further discussion see Bryman 2008; Glaser & Strauss 1967) to data analysis and built into an integrated account exploring the various themes and issues, conceptual and methodological issues of curriculum articulation and alignment in a local context, that is, within the school and educational system and societal context as well as the impact and effect of where curriculum is successfully articulated and aligned.

Reporting occurred thematically but also incrementally allowing theoretical concepts to be seamlessly infused into practical recommendations or hypotheses. The researcher was cognizant of the need to represent what may be abstract or more "blue-skies" modes of thinking in ways which are meaningful and substantive to user cohorts or those unfamiliar with or alienated by grand theory or ornate conceptualizations. Consequently, every care was given in ensuring the final report faithfully represents seminal arguments and formalizations and censured the "dumbing-down" of complex information yet to maximize accessibility and usability.

# Articulating and aligning the curriculum—definitions and issues

To begin, how might we best define curriculum? Curriculum is a roadmap of planned educational experiences conferred to learners by their teachers. Behar (1994) understands curriculum as the totality of experiences undertaken by learners within a programme of education encompassing broad yet defined objectives and goals and as facilitated by established theoretical and empirical accounts. These experiences translate as the syllabus, which represents a formal agreement between student and teacher and articulates course content and requirements for successful completion.

Anderson (2002) identifies the process of curriculum alignment within a triangular metaphor that links:

- objectives and assessments
- objectives and instructional activities and materials
- assessments and instructional activities and materials.

Put another way, curriculum alignment is an umbrella term for the relationship between content validity, content coverage and an opportunity to learn.

In the classroom, instructional alignment refers to the reciprocal and co-informing interface of teachers' objectives, activities and modes of assessment. At the level of school, curricular alignment is concerned with the scaffolding effect and cross-referential qualities of the curriculum across year groups (Tyler 1949). Martone and Sireci (2009) take this further to explore how expectations or standards complement assessment frameworks and steer students through the educational process.

## Curriculum articulation

Articulation refers to the incremental development of learning objectives across the tiers and subject domains of formal education. It is a process of making visible the connectivity of learner experiences that constitute a logically progressive and seamless learning career. Ostensibly articulation is step one or route one in improving student achievement in reference to national or state curriculum guidelines/benchmarks. It is a roadmap that makes explicit the expectations of educational providers/regulators for instruction and assessment. Articulation demands that teachers at various tiers, levels or "grades" of the school system work collaboratively to implement curriculum in ways that make its articulation crystalline. Achieving articulation however is not always easy, particularly given the heavy and competing demands of the school teacher's timetable and a paucity of time for collective brainstorming. The articulation process may be furthermore compromised by disagreement between teachers as to a desired level of focus or connectivity.

The way in which curriculum is interpreted and delivered by teachers may be similarly incongruous with the expectations at national, state, district and school levels. English (2000: 6) reports:

> Curriculum articulation is often lost within the structure of schools in which an egg-crate-type physical environment invites and encourages teacher individuality, isolation and idiosyncratic responses. The issue is accentuated by school-building to building autonomy and isolation involving authority within and across school sites.

Nevertheless, time to work collaboratively in planning and refining instruction and curriculum is preconditional to excellence in teaching.

Strategies to promote curriculum articulation to foster a culture of seamless learning and to reduce achievement gaps include:

- weekly tier/grade/level team meetings for teachers to deliberate content, skills and benchmarks
- professional learning communities (PLC): teachers working collaboratively in the amelioration of classroom practice—attending to collective problem solving, pedagogical innovation and strategies for deep learning while developing an aptitude for constant critical reflection.

In recognizing the significance of curriculum articulation, there is a need for greater consideration of what students have learned as a consequence of their schooling less what knowledge and skills they have amassed externally. Burstein and Winters (1994) refer to this as educators reframing the question from:

> … "What students know and can do" to "What students know and can do as a result of their educational experiences".

Embedded into an understanding of what students learn directly by educational intervention and how this impacts societal well-being is an assessment of the factors that inhibit, deter or deny equal opportunity to learn, or what Schmidt and McKnight (1995: 346) call "a story about children and also about curricula":

> … curricula transforming national visions and aims and intentions that shape children's opportunities for learning through schooling.

An opportunity or lack of opportunity to learn within formal educational contexts is of massive significance to students' learning achievements. Anderson (2002) comments that providing or denying opportunities to learn results in very different education for different students. Where an opportunity to learn is unequal or disproportionate among learner groups, learners may become disempowered, disenfranchised and/or disaffected. Curriculum is thus positioned as a mechanism, which may enable as much as disenfranchise learner groups from the learning experience. This has been evidenced in the studies of Alton-Lee and Nuthall (1992: 6) who identified that:

> … the curriculum excluded or marginalized people by race and gender … and that these processes led to different experiences.

Winfield (1993) makes a similar assessment in determining the opportunity to learn as being explicitly tied to instruction and "school factors". Elia (1994) identifies the opportunity to high-achieving students is greater among minority students than their more advantaged counterparts. Identifying the way curriculum is articulated to learner cohorts is of great importance in determining the ascent of learners along their knowledge trajectories and what may cause aspects of misalignment and missed opportunity even to engage in ways where knowledge and skills can be fairly assessed.

## Curriculum alignment

Studies in curriculum alignment are also important in determining the differences in the processes and effects of schooling across the age ranges. Gamoran et al's (1997) research into "transition" mathematics courses in California and New York evidenced disparities of content coverage between a college preparatory mathematics class, where students learned more, and a general track mathematics class. Low-achieving high school students were identified as faring better where curriculum was designed and delivered in meaningful ways.

Curriculum alignment features as an essential mechanism determining the suitability of what is taught to national systems of assessment. It is also then a feature of accountability in determining not only that students are fulfilling their obligation as learners but that schools are providing the best form of education for them. Baratz-Snowden (1993: 317) argues:

> If students are to be held accountable for their learning, then schools must be held accountable as well by demonstrating that they provide students with opportunities to learn to meet the standards that have been set.

In the amelioration of student achievement or in enabling students to achieve the best they possibly can, Lezotte (2002) identifies curriculum alignment as the most significant "high-yield strategy". The success of the school in facilitating high-achieving students he argues, rests on its integration within a larger educational system with clear curricular goals. These goals are incorporated into a coherent and properly sequenced series of programmes. Lezotte (2002) compares curriculum alignment to a process of "backward mapping" starting with the finished product—the student under assessment—and tracing steps back so as to clearly visualize the journey of learning in ways that make sense to the teacher, independent of textbooks or other learning materials. The teacher must commit to then asking of himself/herself what evidence will be required to test the range of students' knowledge acquisition and synthesis. This process will allow the teacher to confidently identify what alignment exists between the *intended* curriculum and *assessed* curriculum. With these assumptions met, Lezotte (2002: 9) claims that:

> As a teacher, you should be convinced in your head, heart and gut that, if you teach the intended curriculum and the students learn it, they will perform well on the assessment measures.

The spotlight of assessment on learners' achievement and the range of what they know is criticized for its corrosive effect on the learning process itself. The principal criticisms of the effects of mandated testing are multiple but not least: reduced teaching time, an abridged curriculum, a limited focus on the assessment of cognitive skills, and the depleting morale of teachers and students (Roach et al 2008; Smith & Rottenberg 1991). Martone and Sireci (2009) conversely suggest that testing provides a window onto the educational opportunities enjoyed or deprived of students. Assessment, in this light, provides a means of identifying what goes on in the classroom and a means of accounting for the differences in student performance. It is furthermore presented as a mechanism for ascertaining whether all students are able to access the same level of opportunity. Cizek (2001) notes that well-designed tests provide important insights into student performance and aid in funding decisions.

The alignment between intended and assessed curriculum should not however be read as a one-way process. It is not only a case of teachers demonstrating full awareness of examiners' expectations but that examiners themselves be fully cognizant of the content of curriculum and method of its instruction. What is covered in assessment must necessarily correspond to what occurs in the classroom. Where it does not, critics of mandated assessment complain that it inaccurately and unreliably comments on learner achievement while concurrently stifling the curriculum (Resnick et al 2004; Roach et al 2008). Determining the appropriate levels of alignment between the curriculum, instruction and assessment is therefore pre-conditional to any coherent and consistent educational strategy and in fulfilling the aim of providing every student with the opportunity to learn and fairly evidence their achievements.

La Marca et al (2000) argue that assessment must be arranged so that students are able to evidence their knowledge and skills as framed by the expectations of curriculum so that their performance is reliably judged and authentically claimed. They state that alignment is:

> … the degree to which assessments yield results that provide accurate information about student performance regarding academic content standards at the desired level of detail, to meet the purposes of the assessment system …. The assessment must adequately cover the content standards with the appropriate depth, reflect the emphasis of the content standards, provide scores that cover the range of performance standards, allow all students an opportunity to demonstrate their proficiency and be reported in a manner that clearly conveys student proficiency as it relates to the content standards.
>
> (La Marca et al 2000: 24)

Ultimately, the study of curriculum alignment or alignment research is predicated on an integrating practice, where the core elements of the educational structure are arranged synchronistically. Porter (2002: 5) describes this level of consistency as:

> … a coherent message of desired content will influence teachers' decisions about what to teach, and teachers' decisions, in turn, will translate into their instructional practice and ultimately into student learning of the desired content.

Martone and Sireci (2009: 1335) follow a similar diagnosis:

> Alignment studies allow researchers systematically to study the different components of an educational system to compare their content and make judgments about how well they are in agreement.

According to Webb (1999), if the core elements of an educational structure are inappropriately or inadequately aligned then the coherent message of what is valued in the educational process is blurred. Alignment research is consequently integral in evaluating claims of curriculum being "dumbed-down" (Linn 2000); discerning a lack of opportunity for students to demonstrate their learning of instructional content by assessment (Winfield 1993) and identifying where authorities have been slow or idle in responding to issues of instructional quality (Rothman et al 2002).

## Horizontal alignment

Horizontal alignment of curriculum therefore carefully positions and choreographs the provision of learning across subjects and as such, instigates an integrated curriculum where ideas are cross-fertilized, co-informing and interrelated. Curriculum therefore moves beyond bite-sized and seemingly unconnected pieces of knowledge to a holistic knowledge narrative. Subjects therefore where properly aligned converge to tell a larger story of who, what and why. Where cross-curriculum linkage is made, learners may more efficiently blend learning styles indigenous to specific subject disciplines and begin to cultivate themselves as more rounded and holistic learners able to competently enter a multitude of different learning and future professional settings. Where curriculum is successfully horizontally aligned, learners may also more successfully elucidate how skills learned in one subject discipline do not occur or develop in isolation, and that subject disciplines are in multiple ways co-constructing or at least co-informing. In other words, literacy skills ought to be acknowledged not only as necessary for the study of language or literature but in the negotiation of science, technology, engineering and mathematics (STEM) subject areas.

Alignment of this kind will circumvent the prioritization of any one skill set or subject discipline over another. Instead, a flat-hierarchy of subject disciplines ought to occur, and with this a sense of equal standards—not least in the measure of difficulty inferred from different disciplines, such as mathematics habitually presented as hard and off-limits to any but the most talented learners—and equality of assessment, so that all subjects are taught and assessed in the same conditions and by the same evaluative matrix. Ultimately, where horizontal alignment across subject disciplines is best tuned, subjects more easily fit into standardized forms of teaching and assessment and where advances in learning occur on a "level playfield".

## Vertical alignment

A vertical alignment throughout the incremental stages of school curriculum is ostensibly a harder proposition, not least where subject disciplines become increasingly specialized. Analogous to specialism is a paucity of numbers. Not all learners will share the same aptitude nor proclivity to continuously follow a subject and make the necessary crossover from early to mid to higher tiers of formal education and the leap from these to industry. This is no fault of curriculum. Learners are as social agents distinguished by their learning prowess and potential and the manner with which they are able to regulate the forces within and outside formal educational contexts that propel or restrict their educational and professional futures.

Curriculum can however pre-empt many of the factors that exacerbate forms of exclusion in learning settings, by allowing their upward tracks to be less dominated by traditional conceptualizations of progress and equality and adopt a more flexible and discerning outlook on what constitutes effective learning—certainly beyond rote memorization. This is not however to discard memorization as a worthy attribute of the learner, more that the way many forms of learner evaluation—such as one-off examinations and tests or where assessment of the quality of learning is largely superficial and unrelated to any deeper sense of the learner as knowledge worker—are redundant as methods of quality assurance. Memorization is as a model of upward articulation valuable yet perhaps only where it has originated from meaningful interactions or where a whole narrative of learning emerges.

Educators are most able to determine the successful alignment of subjects through school years, where the signposts of progress clearly lead one stage into another and yet enable the learner to be reflective. One of the key qualities of successful learning is an individual's ability to construct a sense of past accomplishment and history that bridges eras of learning and enables a whole narrative around which a field of study emerges. Consequently, vertical alignment requires explicit signposting of what has been learned and where that learning is leading, never where it might end; the latter is the negation of the lifelong learner and collapse of vertical articulation. Therefore, for a subject to be successfully aligned it requires the integration of its formative parts into a cohesive narrative. However, as within a paradigm of horizontal alignment, the ascendant learner must be enabled to capitalize from the knowledge continuum of subject disciplines and recruit from the best of lessons in securing momentum, a sense of purpose and direction. Knowledge and experience specific to certain subject domains may accordingly be imported to explicate or clarify aspects of curriculum that are obscure or opaque. Where subject choices and their associated learning styles are integrated, each becomes ballast to the other. Linking subjects not only provides learners with an intellectual compass to visualize and negotiate disciplines where they might not be so at home but serves to make a more vibrant, exciting and relevant curriculum.

Taking curriculum forward demands an awareness not only of the specificities of industry and how the school and university provide for new generations of scientists, doctors, teachers, bankers, service workers—the list goes on—but how increasingly employers are valuing applicants whose profile is eclectic and experiences are numerous and diverse. Matching what is taught in schools with these requirements demands not only an eye into industry but an understanding of how industry operates by the convergence of core skills born and honed in different subject disciplines. The global marketplace places further pressure on learners and new recruits to demonstrate a multitude of skills and levels of learnedness that vary in demand according to different cultural, political and economic contexts.

## Con/Per-forming to expectations—credentialism and assessment

Credentialism (Collins 1979; Murphy 1984) is the means not only of supposed access to labour markets and concurrently where the knowledge and skills learned in educational settings are transferred in "real-world" applications, but the measure by which what is learned in schools is confirmed and legitimized as relevant and aligned to industry needs. The awarding of credentials demonstrates that learners have accomplished a level of mastery over one or many subject discipline(s), and reflects the accumulation of knowledge or the final stage of the learner as a knowledge apprentice. As such, the awarding of a formal qualification is evidence that curriculum has followed a sequential and cumulative path, where the production of new skills and knowledge has been strategically, and as may be the case, seamlessly implemented. However, a culture of credentialism is shown to be flawed on multiple levels (Brown 1990; Goldthorpe 1996). Firstly, the premise of a credentialed society is one directly linked to a better-educated workforce and consequently a more globally competitive and prosperous national economy. This idea is heavily disputed by a range of labour and education scholars, who identify a culture of credentialism as a false dawn or indeed, false economy. This leads secondly into the notion that credentials, or at least those boasting high credentials, reflect those that are best educated. The correlation between good credentials and good education is however similarly argued as illusory or at best manufactured truth. This is arguably a consequence of over-trust or over-confidence in the reliability or validity of existing forms of educational credentials as markers of academic capability and professional potential. What separates high grades from low grades may be entirely arbitrary and based largely on the subjective interpretations of examiners. Those charged with the design and implementation of curriculum need thus to consider how synchronistic written and taught curriculum is with these interpretations. To do this, educators need to get inside the head of the examiner and begin to systematically correspond high assessment values with the knowledge/skills they are charged to imbed with their students. This of course is no easy challenge. While examination boards may provide scoring matrixes, these may only ever be an approximate guide. How teachers and examiners respond to these may widely differ and cause the assessment process to break down.

An issue then for aligning curriculum with assessment is the relative *interiority* and *exteriority* of teachers and examiners, respectively, to the learning process or in other words, the extent to which teachers are familiar and examiners unfamiliar with the intimate/bespoke details of learner pathways. Where teachers share an intimacy and direct knowledge of individual learners' capabilities and strengths, the examiner may only ever forge a speculative or largely cursory account, based on suppositions drawn from the examination. The examination as one, though pervasive, form of assessment is routinely contested as an unequal space for determining the academic strength of learners, yet nevertheless is arguably the primary/premier mechanism in deducing learner capacity and in awarding academic credentials. The stereotypical image of students crammed into an examination hall is however the very antithesis of knowledge in context. Indeed the examination hall takes learners' knowledge completely out of context by

asking them to apply knowledge in ways completely unnatural to the manifestation of that knowledge, and furthermore in ways that reduces a bank of experience to a miniscule fraction of what may be reasonably recalled.

If then we are to take the model of assessment as testing the learner's capacity to retain and recall factual information, a large swathe of learning-as-doing or learning-through-doing is lost and the curriculum with it. The factory line of knowledge production may evidence linearity between curriculum delivery and assessment and on the face of it, learner progression, but this is at the expense of rounded knowledge and holistic learners. Alignment of this sort arguably requires complication and consideration of the multiple, often meandering and/or peripatetic orientations of learners and their teachers as they make sense of the curriculum. A perfect symmetry between curriculum as taught by teachers, absorbed by learners and tested by examiners is arguably both unrealistic and undesirous. It may as is the case with a culture of credentialism precipitate a false economy where expectations of different groups are unmet. It may also serve, where tracking or streaming occurs to negatively segregate learners and delimit the "opportunity to learn" (Oakes 1985; Bennett 1991).

An alignment of curriculum expectations is necessary for sustained effective learning to occur. Where curriculum expectations fall short or fail to be maintained, there is every potential that both learners and their teachers will lose interest and enthusiasm in subject matter. A failure to meet expectations may frequently come about where curriculum is poorly signposted and where transitions across year groups are jerky and discontinuous. Meeting the expectations of learners is arguably especially difficult in a model of vertical alignment.

Ensuring that curriculum remains coherent while expanding and complicating subject information to complement learners' growing skill and knowledge base is a matter of precise balancing in ensuring that curriculum remains challenging and interesting yet not overwhelming or with a tendency to confuse. As curriculum develops from basic to advanced stages and a whole narrative materializes, there is an incumbent threat where pitching and pace of curriculum inasmuch as content may skew or destabilize and cause student attrition.

Attrition levels among students is arguably especially problematic in STEM subject areas, where the stages of curriculum development are sometimes too spaced or too demanding of students. Where clear alignment wavers, there is every possibility that students will lose sight of subject rationale and become confused and alienated. Maintaining a steady thread that both scaffolds learner development while expanding the perceptual horizons of learners and facilitating the generation of other cognitive and key skills is clearly vital. Ensuring a clarity and vibrancy of subject narrative is however made all the more onerous where a capacity for direct and inspirational forms of dissemination is impoverished. Moving from or at least expanding upon the written curriculum, deploying other more visual, kinesthetic and immediately experiential forms of curriculum is herein advocated. Diversifying the strands of curriculum delivery or what Piaget (1979) calls assimilation is one way of ensuring that curriculum continues to seem relevant and enjoyable to both teachers and learners as it is encountered in ways best suited to both populations.

## Aligning expectations—varied and involved curriculums

The dynamism of written and taught curriculum is best captured and maintained where pedagogy is regularly adapted and kept varied. Where curriculum is rigidly applied with no thought other than attainment by gradation/graduation, its delivery will tend to be all too predictable and more likely than not highly didactic. Learning is understood to occur most where it in some ways indulges the learner; that is, where the learner is able to cultivate an identity licensed and able to participate in learning settings. The key in enabling learners to self-identify as proactive and able is providing them with the keys of the curriculum. This is not to suggest that learners become authors of but that they are empowered as active agents, able to make key choice-decisions impacting the shape and direction of their learning experiences. Where elements of control are delegated to learners, the orientation of subject programmes may become more immediate and valued. Critically, learners may be endowed with a sense of ownership and sense of belonging that may only serve to augment feelings of satisfaction, fulfillment and confidence in what they are doing.

If the ultimate goal of the curriculum is equipping learners with core skills, knowledge and understanding enabling them to participate in real-world settings, then learning is less about rote memorization and more an experiential apprenticeship. It is through the hands-on experience of subject narratives and "a direct encounter with the phenomena" that learners are enabled to locate a sense of self in relation to the subject, their peers and teachers. Learners need to be brought into a subject rather than to be kept at arm's length, where their appreciation of subject knowledge is at best cursory and short-lived. Aligning positive

expectations and goals with positive outcomes requires the critical deliberation of learners in learning not just what a subject is about but why it needs to be studied and what its importance is beyond the walls of the school.

In many ways, aligning the expectations attributed to a written and taught curriculum by learners demands direct and immersive experience of how subjects and teachers are other than and beyond traditional stereotypes. For this to happen, the curriculum needs to be brought to life, re-imagined, reconceptualized and reconstituted as a stimulus for purposeful dialogue between learners, their peers and mentors. Yet always, primarily the learner must be legitimized within this process.

The alignment and articulation of curriculum exceeds the example of linking core subject content to its assessment and world beyond. Any alignment of subject matter must first consider its relationship with its audience. Without this initial focus, alignments of other sorts are largely immaterial. Therefore, aligning and ensuring the appropriateness of subject material and pitching are quintessential to the generation of a productive learning environment.

To begin, an educator must ask, “Who are my learners and how shall I speak to them?” Secondly, educators might prefer to think of themselves as pedagogues that facilitate rather than generals who instruct. The most effective participatory pedagogies are those where the relationship between instructor and student is relaxed or less inhibited by the stricture of formality evidenced in many conventional learning settings. This is not the same as advocating classroom anarchy, but that students be encouraged to assume, if only gradually, increased responsibility for their learning, where educators are more stewards or ballasts supporting the development of critical minds. In this context, curriculum requires flexibility or an elasticity that allows learners to respond to specific aims and objectives in a way that is personally directed. In other words, flexible learning requires a personalized curriculum.

# Aligning the curriculum beyond the classroom

> The engaged voice must never be fixed and absolute but always changing, always evolving in dialogue with a world beyond itself.
>
> bell hooks

Alignment and articulation are integral processes in the conceptualization and implementation of school curriculums in national contexts. They are at once the mechanisms that correlate the content and format of educational supply with economic demand. In other words, they are processes that rationalize and reify the curriculum as relevant, necessary and as fulfilling the needs of national labour markets. To begin, the process of alignment in curriculum development may occur as a form of horizon scanning and base-lining of the core requirements necessary for a literate and mobile workforce. In the UK context, considerable focus has been attributed to an investment in education as a driver for economic stability and national prosperity (Brown & Lauder 1996). In this vision, what is taught in schools and how it is taught are mitigating factors in the generation of learners able to rationalize and reconcile their own academic and professional trajectories and their existing educational identities and future occupational imaginaries, by firmly visualizing what they learn as tools for what they will be and do. Accordingly, an ability to clearly align curriculum content with the skills demanded of national economies and increasingly a global economy not only stabilizes these economies by meeting their labour requirements but instigates a learning culture whose members are proficient, self-motivated, flexible and critically reflexive.

Those responsible for the generation of curriculum need to be cognizant of the multiple, if often invisible, social factors that may bring about disparity and forms of inequality among learner groups, and that the format and delivery of curriculum may ultimately extend and/or reinforce these. Learning is a socially situated activity and most effective when a climate of cooperation and collaboration emerges among learning peers and their instructors (Shor 1992).

Unfortunately the design of curriculum and the way with which it is articulated may have a deleterious effect in the development of learner confidence, a sense of efficacy and entitlement. Indeed, curriculum may not only contain but constrain the development of the inquiring mind and self-directed learners. Where curriculum suffers from a proscriptive compartmentalization of knowledge chunks, or is reduced to a process of rote memorization, then the extent to which learners may realize it as connected to a “real world” beyond the classroom depreciates.

Too frequently it appears that curriculum appears in unrelated and uncontextualized strands, where subject disciplines appear in silo and as fragmentary pieces of knowledge. Of course knowledge does not occur in

isolation but as ought to be in the context of school learning, interconnected, complementary and, though not always linear, at least progressive.

Accordingly curriculum needs to be considered and disseminated in ways where linkage is clearly signposted and where the skills and knowledge that come with interaction are cumulative and attributed to a larger knowledge toolkit. Firstly, however, it is necessary to consider what forms of knowledge need be learned and how these forms of knowledge are presented in ways that enrich learners and enable interest, curiosity and potentially even a "lifelong" interaction. Secondly, allusion has been made to interaction—this is a key focus in the construction of curriculum and certainly one which moves towards the emergence of immersive learning styles and learners able to not only record and replay information but synthesize it.

Curriculum is therefore best aligned to "real-world" scenarios where it articulates the skills required of the workplace in experiential ways. Increasingly educational researchers and educational philosophers are advocating forms of learning that benefit from flexible and participatory curriculum (Schniedewind 1991). Put simply, educationalists of all subject disciplines are increasingly aware that the best learning is a learning of doing and becoming —where curriculum is manifest as a series of textbooks and unidirectional forms of instruction, its focus becomes inhibited as it appears exclusively rooted to and belonging within the classroom. Progressive curriculum identifies a move away from the learner as an observer of his/her learning to author of learning. Curriculum must then be articulated and mobilized in ways that empower the learner as an active participant, less a recipient of knowledge.

A developmental and incremental curriculum must be conscientious, realistic and in no way undermine, rush or hurry the formative stages of learners' development. Curriculum as a layering process may be imagined less as an upward pyramid and more a multi-flow continuum. The curriculum develops across or horizontally synchronistically with its upward ascent. Key skills of literacy, numeracy, comprehension and synthesis span across curriculums as the learner progresses in different subject disciplines. Curriculum developers need therefore to be cognizant of the pedagogical and stylistic differences across the subject disciplines, not so that subject learning occurs in silo but instead the exact opposite—for the curriculum to be differentiated into its subject specialisms but concurrently identified as the accumulation of core skills into the individual learner. Skill development, forms of assessment and pedagogy therefore need to be calibrated and appropriate to reflect the same consideration for learners across all subjects, allowing for equal development. Alignment of subject specialisms needs also to occur as they challenge the learner with more demanding and sophisticated levels of learner activity. The curriculum therefore must serve as a solid infrastructure able to scaffold and facilitate learners' cognitive and emotional development across subject disciplines.

# Articulation and alignment in international contexts

In the United States (US), the No Child Left Behind (NCLB) legislation features alignment between state level standards and assessment as a mandatory requirement in meeting yearly progress targets (US Department of Education 2002). States are required to evidence the ways with which their assessment models dovetail with state standards (Johnson 2005; Lefler et al 2005). Alignment of the various components of an educational system is essential in ensuring a shared vision and purpose. It may also allow policymakers and educators to better identify and plan for what works best.

In the European context, the harmonization of curriculums is evidenced within the European Qualification Framework for lifelong learning, which developed categories of knowledge skills and competencies; the Common European Principles for Teacher Competences and Qualification; and alignment at the level of Higher Education with the Bologna Process. Key competences in the European Union (EU) framework are stipulated as those that "all individuals need for personal fulfillment and development, active citizenship, social inclusion and employment".

Cross-curricular competences are seen to epitomize integrated learning and an equilibrium of learning content and skill formation with assessment. Other international organizations have been integral in guiding this work and include contributions from UNESCO to the United Nations programme "Education for All"—establishing the International Commission on Education for the Twenty First Century. The OECD DeSeCo (Definition and Selection of Competences) also made a significant contribution to the development of competence frameworks in the EU.

# Curriculum map as a strategy

It is useful to think of how processes of articulation and alignment might be more effectively and efficiently managed in the context of IB programmes. One proposal lies in the implementation of a curriculum map. A curriculum map may be enormously beneficial to curriculum developers and teachers in identifying what is being taught and how this corresponds or complements larger or more profound educational goals. A curriculum map generates a word snapshot of the educational agenda of every classroom/department/school or authority/district. It captures the knowledge content, core skills and assessments of every teacher within a school and educational authority/district. This information is transferred into a high impact visual that charts instructional trajectories. An essential feature of the impact map is its synchronicity with the events of the school calendar ensuring the accurate projection and realistic accomplishment of key milestones—a seamless line of progress. Two groups are responsible for the generation of the curriculum map and include a curriculum team and classroom teachers. The curriculum team is responsible for the conceptualization of the curriculum map and the determination of its feasibility in line with school/system resources/capacity. The curriculum team includes educational administrators, managers, chairpersons and instructional leaders. With this group assembled, teachers are recruited to provide essential information about instructional content, skills building and assessment that is chronologically plotted by the curriculum team as the organizational hub in the generation of the curriculum map. A process of review then begins.

The curriculum map is subsequently used to identify any problems of sequencing and points of disruption to the desired "seamless" flow of curriculum or issues of horizontal or vertical alignment. Where courses are correctly aligned, teachers are able to determine what students learned in their preceding year group and appropriately plan for the knowledge and skill development. This saves valuable time otherwise spent trying to determine the status of a student's development and having to re-teach. Horizontal alignment ensures that all teachers of a common year group/grade have "paced" instructional content/skill formation/development at a similar rate.

Once vertical and horizontal alignments have been addressed, a curriculum map review team identifies common points of instruction and overlaps, allowing an increased fluidity between interdisciplinary connections. Where teachers make more explicitly manifest subject connections, a more holistic curriculum emerges that allows students to more ably make connections between different sources of information, accordingly increasing the relevancy of skills and learning content.

# A personalized curriculum

A personalized curriculum is one that does not necessarily flout the demand for standardization in what is taught and assessed but offers different learning pathways to suit different learning groups and styles. At its core, a personalized curriculum relies on the taught curriculum speaking to learner groups in ways they can comprehend, make connections and generate substantive meaning. A personalized curriculum might then also translate subject disciplines in ways that inspire prolonged interest and a motivation to learn.

A personalized curriculum therefore features in many ways a realignment of students' expectations, where curriculum is enlivened and made pertinent and visible in the minds of learners and where their own learner identities materialize and potentially flourish. Where curriculum is made engaging, learners are empowered in visualizing subject knowledge in more penetrative, insightful and enriched ways and making choices that influence their own knowledge journeys (Watermeyer 2011b). Where learners are given charge to regulate their own curricular experiences, they are simultaneously ascribed agency and placed at the heart of the learner experience. In so being, the relationship between the curriculum, educators and learners becomes more fluent, interfacing and consequently better aligned.

Where learners are placed at the heart of curriculum development and less as an afterthought, the transition between written and taught curriculum is better enabled. Similarly, where the learner is repositioned from empty and passive receptacles of new knowledge to being with his/her teacher who is a co-constructor of subject knowledge, curriculum is an enabling factor in the generation of a positive learning relationship (Shor 1992).

Where the respective roles of learner and teacher are realigned in such ways, and where the written curriculum reconfigures from learning imposition to learning stimulus, the cognitive development of learners may arguably enhance where they themselves are positioned as active knowledge workers. In this imaging, curriculum as open is also self-generating and enriched by the new perspectives drawn from the symbiosis of teacher and student as knowledge workers. In this sense, where curriculum is owned by learning assemblies—and we may take this to mean educators and students working in tandem—it is concurrently

democratized. The democratization of the curriculum in a macro sense is about building bridges to learners of every kind; it is about universalizing subject matter and making it available and known, especially to those habitually disenfranchised or placed on the outskirts of learning. Where curriculum is democractized, it is made plural and diverse and reflects the composition and subsequent needs of national societies.

Where curriculum is written and taught in unilateral ways, there is every potential that learners will become disengaged and disaffiliated from the learning experience. However, where curriculum is conceived and implemented in a fashion that is aligned to the make-up of the modern world, transitions of knowledge and the acculturation of expertise enhances. A democratized curriculum, one that locates knowledge and expertise in the context of a socially/culturally/politically differentiated and heterogeneous world, allows the learning experience to acquire depth and breadth. It also means that while curriculum can be global it is also indigenous and belonging to its locale.

The democratization of the curriculum is inseparably linked to the personalization of the curriculum or the materialization of a curriculum that speaks to learners in ways they understand and in ways that allow them to talk back. This realignment of sorts is thus premised on the reconfiguration of learner identities as not only those that listen but lead.

# Issues of inequality and misalignment

Where the written and taught curriculum are constrained or adversely affected by external social conditions that marginalize learner groups in formal/traditional settings, the construction and delivery of the curriculum needs to occur in contexts where it may be re-imagined as something dynamic, personal and democratic. In the following section, curriculum alignment and the way curriculum is articulated is considered as benefiting from an informal and experiential learning paradigm. This draws together many of the previous suppositions that the taught curriculum is most vital, effective and aligned—furthermore contributing to meaningful forms of assessment where it is encountered as a collaborative, participatory and non-hierarchical venture.

STEM subjects are especially susceptible to issues of inequality, where the arrangements of instructional content, delivery and assessment are rigidly one-sided. Young female learners are a group that continues to be alienated and excluded from active and equitable status in STEM. This is evidenced by conspicuously low rates of female participation in STEM as a subject and occupational choice (National Academies Press 2007). This is the result not only of gender bias in the curriculum, classroom and pedagogy, but of insufficient provision in attending to the development of self-esteem, confidence and aspiration of female learners (Orenstein 1994) at a critical formative stage when, as Johnsen and Kendrick (2005) claim, they are perhaps most vulnerable.

Occupational choices are frequently seen to correspond to a history of academic success or proclivity (van de Werfhorst et al 2003). They are characterized by a limited awareness of post-16 employment and training opportunities (Foskett & Hensley-Brown 1997); demonstrate vague and unrealistic expectations (Howieson & Semple 1996); and correspond to the same tentative, speculative (self-)perceptions of suitability and fit that informed earlier subject choices (Ryrie et al 1979). Moreover, subject choices may, as Salisbury and Riddell (2000: 123) argue, be “overly influenced by the traditional attitudes and unequal opportunity structures of society”.

Many students’ subject and career choices may prove to be accidental, inherited or unintended (van de Werfhorst et al 2003). Worse still, some subject choices whose occupational link is obscure may be discarded without thorough consideration. Without explicit linkage, the learner is extremely limited in visualizing the journey from subject to career or unable to project future identity with limited mediating concepts (Engeström et al 1995). Accordingly, occupational aspiration is not only curtailed but mythologized. Such was the sentiment of Dewey (1997), who argued that the object and context of learning should not be separated and that the intimate linkages between learners’ cognition and the context of its happening be defended. Although many schools support students with career counselling this often tends to occur when time for careful deliberation is sparse and pressure to commit to choices is high. Rash or rushed choices may thus detrimentally affect or close off prospective career pathways. Furthermore, the extent to which work experience actually enriches and positively impacts the learner is largely unexamined (Guile & Griffiths 2001).

Arguably one of the greatest challenges for the school teacher is in translating the applicability and utility of curriculum or mediating the relationship between individual, object and mediating artifact (Vygotsky 1978). In this respect, the teacher also represents a principal agent in regulating the gender order of the classroom (Dixon & Foster 1998). The complaint that certain subjects lack real-world merit or relevance is challenged by informal learning programmes, which as cumulative knowledge transactions try to make

the crossover clear. Skillful mediation therefore between understanding and knowledge generated in the classroom and the real-world application of such knowledge is absolutely essential not only in situating the individual in the context of her learning (Vygotsky 1978) but in stimulating and retaining interest in subject content. What Piaget (1979) then refers to as the accommodation and assimilation of knowledge, or intelligent adoption, forms the blueprint of holistic pedagogy.

Participative, integrated and what Kolb (1984) calls “experiential learning” provides a “direct encounter with the phenomena rather than merely thinking about the encounter” (Borzak 1981: 34). However, the success or extent of these encounters is shaped by a multiple of constituent factors not least the ability of participants to interact as co-creators of experience. This must be reflected in the design of the written curriculum and delivery of the taught curriculum.

The transfer of curriculum into meaningful learning is neither linear nor unilateral. There is neither one approach nor one consideration when approaching how the curriculum might be translated in ways that inspire depth, breadth and resonance to learning. In aligning curriculum with positive learning outcomes, educators must be careful to avoid a “one-glove-fits-all” mentality. Where learners are treated as an undifferentiated mass there is a great potential for the assimilation and synthesis of new knowledge to stutter if not completely stall. Instead, the demands and needs of learners need proper recognition, articulation and alignment. The notion of the curriculum as a series of educational stepping stones that sequentially and automatically lead to good grades and sound credentials takes no account of the differential capacities and learning strategies of learner groups. There is no sense in believing that all learners will happily or easily follow the same set of stepping stones. For many the route will be unmanageable and defeating. For some, learning steps are more spaced, slower or erratic. Suppositions of a fast-tracked linearity that conjoins curriculum with assessment is for many, if not most, illusory.

# Issues of social diversity, equality and mobility

Consequently, when aligning the written and taught curriculum, educators must be aware of the heterogeneity of learner populations. Alignment thus requires pedagogy to be loose, malleable and able to respond to the diverse and sometimes competing needs of learners. The danger of too sharp or focused an alignment is of a self-fulfilling prophecy or the negation of learners for whom education is an uneasy process. Teachers will undoubtedly and routinely throughout the course of their career encounter students whose motivation for learning is sound, but their capacity to navigate the demands of learning strategy buckle, especially where strategy is too heavily regimented or systematic. For those with learning difficulties, special educational needs (SEN) or emotional behavioural difficulties (EBD) for example, learning progress will be neither straightforward nor always guaranteed. Indeed, there will be many among this cohort for whom existing systems of delivery and assessment are redundant. There is then within the structure of formal education every potential that students may through no fault of their own become misaligned or marginalized. Of course as Bourdieu and Passeron (1991) point out, educational success is not just a process of student aptitude but the forms of cultural capital that mobilize learners as respectively adept and deficient. The polarization of learner groups according to the means most frequently used of their families or those who support or invest in their educational development, both in kind and financially, is evidently a decisive factor disrupting the flow of alignment between iterations of the curriculum and how it is interpreted and related to aspects of social life. Models of alignment might thus be re-imagined in the context of cultural capital as a mitigating factor in the production of different learner stepping stones. To extend the metaphor, an enlarged cultural capital belonging to the privileged and wealthy draws the stepping stones of alignment closer together where the steps are separated by chasms of space for those less fortunate.

Social mobility, the buzzword of recent times or its deficit synonymous with those of low cultural capital, makes the route to subject expertise (and its formal endorsement) evermore arduous. The marketization of education has further exacerbated the polarization and segregation of learner groups and in many but privileged instances made the curriculum unworkable—not least where it is devised by those whose material and cultural resources and orientations are entirely disparate and unlike their students. The cultural referents, hooks and points of focus for curriculum when delivered by those culturally different from or even antagonistic to learner groups may culminate in the deterioration of the learning contract and the distancing of learners from any meaningful involvement. Where cultural and material resources are unequal, the availability of choice or form of choice committed to (Ball, Bowe & Gewirtz 1996) by parents of school-aged learners will vary. The idea of choice promulgated by enthusiasts of a market economy for education is largely duplicitous as only those with sufficient capital and mobility are made able to participate. The idea of an equality of educational choice is premised upon the misassumption that an open market economy consists of schools being equally competitive and equally successful (Brown et al 1999). Instead, schools are polarized by the relative wealth and impoverishment of their resources and infrastructure, which tends

to denote their relative success or failure as educational institutions or credential providers. Privilege in this model tends to infer esteem and from esteem, quality.

Parents of learners, particularly those of the more mobile or middle classes, are seen to exploit what their relatively abundant capital allows in playing the market game of education by locating to areas where the best schools are found, or those whose intake is largely homogeneous and or seen to attract the best students. In the UK context, these schools are routinely found in areas of economic prosperity and cultural affluence. In this context the curriculum where written, taught and tested encounters a new form of articulation and alignment, which stems from education becoming "a commodity under market conditions" (Brown et al 1999). As Bernstein (1990) puts it, "Knowledge after nearly a thousand years is divorced from inwardness and is literally dehumanized".

The commodification of education thus ironically champions the cause of a symmetrical curriculum and process of assessment and achievement. Where buy-in to forms of learning is the process of access to quality education, types of learners will tend to become less differentiated and more one of a kind. In this instance, the content of curriculum, the way it is delivered and the way students are to be tested becomes largely formulaic and one-dimensional. Alignment may well be achieved but this occurs at the cost of deadening curriculum with a singular cultural perspective.

# The marketization of education—realigning the curriculum

The implications of the marketization of education are therefore three-fold: the polarization and misalignment of educational trajectories as mitigated by the relative cultural capital of high income/class and low income/class groups; a disequilibrium and disempowerment across learning relations and misconceptions of achievement and assessment. To use a standard generalization, the worst schools or at least worst-attaining schools are generally those seen to be attended by students with low cultural and material capital, as the best or high-attaining schools are populated by the affluent and mobile. With this model of school differentiation comes the differentiation of learner, teacher and parent types.

In the instance of the low-achieving school, the content of curriculum and the capacity of teachers to teach is made all the more onerous by a student population who may be 1) so populous as to be crowded; 2) less able to make the connections to subject matter as it is without context or reference to their home lives; 3) less sure of the relevancy or benefits of education without real-world contexts; 4) resistant to certain forms of pedagogy or school regulation and 5) disenchanted. For these groups a disconnection from the curriculum means the learning environment requires rediscovering in forms that are not aligned to standard forms of teaching and assessment. Though deviation from normal, government-sanctioned forms of teaching and learning may be requisite, they may also be incommensurate with the methodology of assessment that confers the various tiers of educational award. In other words, traditional forms of assessment may be incompatible among learner groups for whom traditional forms of pedagogy are insufficient. These groups may be those for whom the hallowed turf of academe is either unattractive or unrelated to their own cultural sensibilities or heritage. Traditionally, this is evidence of a bifurcation between a learned and working class or groups whose learning orientations or skill sets separate as academic and vocational respectively. This arguably has been no more noticeable in the history of British universities as bastions of a cultural elite. Indeed, the structure of higher education in the UK has traditionally been arranged in correlation with the formats and pedagogical techniques found in schools explicitly aligned in mission and focus. There is arguably little wonder therefore that a common trait not only in British universities but globally is a transmission model of pedagogy, manifested in largely didactic, transmission forms of learning such as the lecture.

It should hopefully become clear that forms of alignment in educational contexts and links, tiers and standards of learning suffer from the potential of becoming moribund and resistant to the promise of creativity, imagination and the critical conscience, as well as serve as empty signifiers.

Disequilibrium among learning relations occurs where the material/physical culture of learning, such as the school, replicates and even reinforces external social inequity. As such, in low-achieving schools, the relationship between learner and teacher and parent and teacher is markedly dissimilar from those in high-achieving schools. Low-achieving schools may be too frequently susceptible to academic resignation or a feeling that the academic potential of students may be limited. In this context, the school's learning culture is affected by low-expectations and potentially even a sense that the curriculum is and will remain unavoidably foreign and/or unattractive to students whose personal investment as learners is low. The relationship between students and teachers may in this instance be characterized less as one that is

facilitative, reciprocal or democratic and instead one in which the teacher is forced to apply a top-down approach, where the value and import of learning and relevance of curriculum is a matter of insistence, even imposition. In a culture of anti-learning where teachers struggle to maintain even the most cursory interest in subject disciplines among their students, the learning contract weakens and the potential for clear articulation, continuity and formative development wanes. Where learning accelerates with learner and teacher in symbiosis, clear linkage and a sense of going somewhere, an anti-learning sentiment, reinforced by external cultural values, derails the potential of mutual learning between teacher and student. The relationship between teacher and student may then become increasingly unsettled and ill-defined, certainly where teachers become little more than custodians of good classroom order and behaviour. In this instance, hierarchical barriers segregate the student from teacher and by extension, with the teacher as gatekeeper and role model of subject expertise, erodes and/or contaminates learners' participation in the curriculum.

Ultimately, the curriculum closes down and is made unavailable through a lack of participation. An assessment of learners' achievement where they are exterior or disenfranchised from the learning process, willfully or not, is at once obsolete and self-perpetuating. Assessment is obsolete as it may be testing knowledge that suffers from a baseline of nil. It is self-perpetuating, in that it confirms the misalignment between learners (lack of) participation in curriculum, their inability to be tested, their statementing as deficient and their routine exclusion from a knowledge society/economy as non-conforming knowledge workers. The articulation of curriculum and the way it is then aligned between stages of educational development and between learning agents is wholly contingent upon the capacity of all agents—learners, teachers, parents—to meaningfully participate. Herein is the justification for a curriculum that is experientially driven, where the framework for successful learning begins with an insistence that learners' positive interactions with subject materials, leaders and facilitators are critical both to the emergence of the subject as a valid and necessary discipline and the generation of knowledge workers.

# Final thoughts

Articulating and aligning the curriculum is a complex and time-consuming endeavour, requiring the cooperation and collaboration of teachers, educational managers and regulators. Synergies of this sort may however not always be forthcoming or can be problematized by issues of individual autonomy—or its disappearance—and issues of capacity and infrastructure. For example, schools as the micro of learning are increasingly outmoded where in a globalized age the school community is heterogeneous and made up of myriad identities and cultural, social and economic backgrounds. Learner toolkits may be massively inconsistent, and no matter how much teachers plan and prospect, their capacity to steer or facilitate learning may be hindered by factors external to the learning environment.

For the IB, as an international provider of education, an awareness of the different social, cultural, economic and political contexts is preconditional to the shaping of curriculum, not least in ensuring that what is taught matches the requirements for national buoyancy (of all types) but that what is "written" as curriculum is transferable as a "taught" curriculum. It is essential to appreciate that curriculum is never static nor immutable but is a process of constant evolution in response to an ever-changing world. The three principal programmes of the IB—the Primary Years Programme, the Middle Years Programme and the Diploma Programme—serve to respond to the interconnectedness of a globalized world. Where the IB stresses an emphasis on the acculturation of the individual as a cohesive whole or as a learning citizen, this comes from a seamless learning trajectory or the interweaving of learners within the fabric of the learning experience. Elucidating learners' social, cultural, economic and political relationship to the world comes most effectively where the learning space facilitates smooth learning transitions, where the perceptual gaze and powers of cognition are reinforced and expanded by being able to look reflectively at the knowledge and skills that have brought him/her thus far. In the IB vision of the holistic learner, the self-recognition of the learner as an active agent within a knowledge continuum is key. The cultivation of a positive learner identity, the building of self-efficacy, legitimacy and mobility comes from the enlargement of *learning capital*. Crucially, learning capital is not the exclusive entitlement of the socio-economically advantageous but is something realistically attainable for those whose experience of education is of learning as focused, meaningful and relevant. Learners ought therefore to be not only inhabitants but authors of the learning experience. They must be cognizant of the roadmap plotting their educational journeys. In so doing, learners may be more suitably equipped to tackle the multiple challenges of the labour market and their role as knowledge workers within a knowledge economy.

Unfortunately, curriculum has suffered in some national education systems from being suspended in time. Where this has happened, curriculum appears outmoded and irrelevant. This situation is habitually exacerbated by pressure of assessment and aligning what is taught in the curriculum with performance indicators. With constant pressure for educators to yield high test and examination scores from their students, an assessment culture is seen to largely dictate the relationship between a written and taught

curriculum. In other words, educators are forced to adapt curriculum in ways that ostensibly have less to do with learning and more with an ability for students to excel in examination situations. In this context, the curriculum is reduced from a learning resource used to induce a skill and knowledge base transferable in multiple and non-educational contexts, to pockets of information that exclusively satisfy largely artificial and often misguided understandings of what constitutes good learning. A focus on assessment occurs as a process of standardization, where the quality of educational provision is made (almost) universally comparable; where league tables that demarcate successful schools from lesser are ubiquitous and necessary for (certainly in the UK context) sustained state investment; and as a facet of a burgeoning culture of credentialism.

It is essential to appreciate that curriculum is never static nor immutable but is a process of constant evolution in response to an ever-changing world. Articulating and aligning the curriculum is however necessary not only to ensure learners' progression but that learning is made relevant and cohesive to learners themselves. Knowledge and skills should not be taught in isolation but as an integrated package that traverses the bounds of subject specialism and instead builds a more mobile, adaptable and efficient type of learner.

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